

Cleveland State University

EngagedScholarship@CSU

Undergraduate Research Posters 2016

Undergraduate Research Posters

2016

Design and Development of a Microfluidic Platform to Induce Mechanical Stimuli on Growing Axons

Edward Jira
Cleveland State University

Erin Tesny

Follow this and additional works at: https://engagedscholarship.csuohio.edu/u_poster_2016



Part of the [Engineering Commons](#)

[How does access to this work benefit you? Let us know!](#)

Recommended Citation

Jira, Edward and Tesny, Erin, "Design and Development of a Microfluidic Platform to Induce Mechanical Stimuli on Growing Axons" (2016). *Undergraduate Research Posters 2016*. 44.

https://engagedscholarship.csuohio.edu/u_poster_2016/44

This Book is brought to you for free and open access by the Undergraduate Research Posters at EngagedScholarship@CSU. It has been accepted for inclusion in Undergraduate Research Posters 2016 by an authorized administrator of EngagedScholarship@CSU. For more information, please contact library.es@csuohio.edu.



Design and Development of a Microfluidic Platform to Induce Mechanical Stimuli on Growing Axons

Washkewicz College of Engineering

Student Researchers: Edward Jira and Erin Tesny

Faculty Advisors: Jason Halloran and Chandra Kothapalli

Abstract

In cases of injury and degenerative diseases, stresses can be placed on individual nerve cells in the human body that greatly, and often permanently, impact the function of the human nervous system. In order to treat these it is imperative to better understand the effects these stresses can have on the development and function of individual neurons. Because of the logistical difficulties of studying cells in-vitro, it has become increasingly popular to study neuronal cells in vivo using microfluidic devices. Current studies focus mainly on the impact of chemical signals on neurons. The focus of this study however, is to develop a versatile system for testing a variety of mechanical stimuli and its effect on axonal outgrowth and signaling in neurons. In this study a microfluidic device was designed and produced in which neurons could be cultured. The device design encourages unidirectional axon outgrowth in the cells so that once the cells are grown, stresses applied to the device itself will impact each cell in a similar manner. With the mold created, a high number of identical device can produced and cultured in parallel to study different mechanical stimuli such as tension and compressive forces placed on the axons.